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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,701	01/29/2001	Toru Tatsumi	NECW 18.281	3273
26304	7590	06/29/2005	EXAMINER	
KATTEN MUCHIN ROSENMAN LLP			TSAI, H JEY	
575 MADISON AVENUE			ART UNIT	
NEW YORK, NY 10022-2585			PAPER NUMBER	
			2812	
DATE MAILED: 06/29/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/744,701

Applicant(s)

TATSUMI ET AL.

Examiner

H.Jey Tsai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 47-56 and 118-121 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 47-56 and 118-121 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 3/11/05.
- 4) ☒ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. 5/31/05.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

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Prosecution on the merits of this application is reopened on claims 47-56 and 118-121 considered unpatentable for the reasons indicated below:

Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on March 11, 2005 prompted the new ground(s) of rejection presented in this Office action.

Applicant is advised that the Notice of Allowance mailed is vacated. If the issue fee has already been paid, applicant may request a refund or request that the fee be credited to a deposit account. However, applicant may wait until the application is either found allowable or held abandoned. If allowed, upon receipt of a new Notice of Allowance, applicant may request that the previously submitted issue fee be applied. If abandoned, applicant may request refund or credit to a specified Deposit Account.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 47-49, 51-54 and 118-120 are rejected under 35 U.S.C. § 102(b) as being anticipated by Fujii et al. 5,006,363, cited by Applicants on March 11, 2005.

Fujii et al. discloses a method of forming a metal oxide layer the semiconductor substrate by a thermal CVD method, which includes:

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introducing metal organic material ( $\text{Sr(DPM)}_2$  and  $\text{Ti(OC}_3\text{H}_7)_4$  , inlets 28-29) and oxidizing gas (oxygen, inlet 25) into vacuum chamber through separate introduction inlets, see fig. 2, col. 7, lines 10-30,

heating the substrate ( $180^\circ\text{C}$ ) in the vacuum chamber and keeping the total pressure of the vacuum chamber at less than  $< 1 \times 10^{-2}$  torr ( $5.7 \times 10^{-4}$  torr through out the period of the film deposition), col. 7, lines 10-30,

wherein the film formation is carried out by controlling the gas supply conditions for the

organometal gases and/or the oxidizing gas to be self-controlling gas supply conditions (introducing oxygen gas first then organometal gases with separate introduction inlets) as to obtain the metal oxide dielectric film having a prescribed composition and crystal structure (perovskite-type crystalline structure, col. 7, lines 32-42,

wherein the flow rates of organometal gases and the oxidizing gas are directly controlled

without using a carrier gas to introduce the organometal gases and the oxidizing gas into the vacuum chamber, col. 7, lines 1—31,

wherein the metal oxide dielectric film is a PZT film or a BST film, col. 6, lines 11-15 and col. 9, lines 65-68,

wherein the substrate has capacitor electrodes formed thereon which comprises at least one of metals or metal oxides of Pt and the metal oxide dielectric film is formed on the substrate in vapor phase, col. 7, lines 25-42.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 50 and 55 are rejected under 35 U.S.C 103 as being unpatentable over Fujii et al. as applied to claims 47-49, 51-54 and 118-120 above, and further in view of Eguchi et al. 5,618,761 and Moise et al. 6,211,035, both are previously applied.

The difference between the references applied above and the instant claim(s) is: Fujii et al. teaches forming metal oxide layer with organic metal source and oxygen oxidant but does not teaches using an oxidant of nitrogen dioxide, aluminum wiring and chamber wall temperature. However, Eguchi et al. teaches at that col. 3, lines 38+, col. 5, lines 45+, col. 6, lines 8+, col. 9, line 53+, col. 12, lines 50+ and col. 14, lines 30+, forming a PZT film with  $ABO_3$  crystalline structure with organic metal gas source and nitrogen dioxide oxidant with reactive chamber pressure at 400 torr or less (col. 6, lines 58+) and a platinum bottom electrode. And, Moise et al. teaches at col. 6, lines 19+, forming aluminum metal wiring layer 348.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings forming a metal oxide film by using nitrogen dioxide as oxidant and forming aluminum wiring layer as taught by Eguchi and Moise because metal oxide can be used to form a non-volatile memory device and nitrogen dioxide is not as reactive as oxygen and using aluminum for interconnection with the semiconductor chip.



Claim 56 is rejected under 35 U.S.C 103 as being unpatentable over Fujii et al. as applied to claims 47-49, 51-54 and 118-120 above, and further in view of Yunki et al. 5,776,254, previously cited.

The difference between the references applied above and the instant claim(s) is: Fujii et al. teaches forming metal oxide layer with organic metal source and oxygen oxidant but does not teaches the temperature of chamber wall. However, Yunki et al. teaches at col. 13, lines 17-27 and abstract, forming a metal oxide film with heated chamber wall. And, the specific temperature of chamber wall as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings forming a metal oxide film by heating the chamber wall with specific temperature as taught by Yunki et al. because metal oxide would formed on the substrate instead of chamber walls.

Claim 121 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujii et al. 5,006,363, cited by Applicants on March 11, 2005, in view of Yunki et al. 5,776,254, previously cited.

Fujii et al. discloses a vapor phase growth method of a metal oxide layer the semiconductor substrate by a thermal CVD method, which includes:

introducing metal organic material ( $\text{Sr(DPM)}_2$  and  $\text{Ti(OC}_3\text{H}_7)_4$  , inlets 28-29) and oxidizing gas (oxygen, inlet 25) into vacuum chamber through separate introduction inlets, see fig. 2, col. 7, lines 10-30,

heating the substrate ( $180^\circ\text{C}$ ) in the vacuum chamber and keeping the total pressure of the vacuum chamber at less than  $< 1 \times 10^{-2}$  torr ( $5.7 \times 10^{-4}$  torr through out the period of the film deposition), col. 7, lines 10-30,

wherein the film formation is carried out by controlling the gas supply conditions for the

organometal gases and/or the oxidizing gas to be self-controlling gas supply conditions (introducing oxygen gas first then organometal gases with separate introduction inlets) as to obtain the metal oxide dielectric film having a prescribed composition and crystal structure (perovskite-type crystalline structure, col. 7, lines 32-42.

The difference between the references applied above and the instant claim(s) is: Fujii et al. teaches forming metal oxide layer with organic metal source and oxygen oxidant but does not teaches the temperature of chamber wall. However, Yunki et al. teaches at col. 13, lines 17-27 and abstract, forming a metal oxide film with heated chamber wall. And, the specific temperature of chamber wall as claimed are taken to be obvious since these are variables of art recognized importance which are subject to routine experimentation and optimization and discovery of an optimum value for a known process is obvious. In re Aller, 105 USPQ 233 (CCPA 1955). And, even if applicants' modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art, In Re Sola 25 USPQ 433.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the above references' teachings forming a metal oxide

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film by heating the chamber wall with specific temperature as taught by Yunki et al. because metal oxide would formed on the substrate instead of chamber walls.

### **Conclusion**

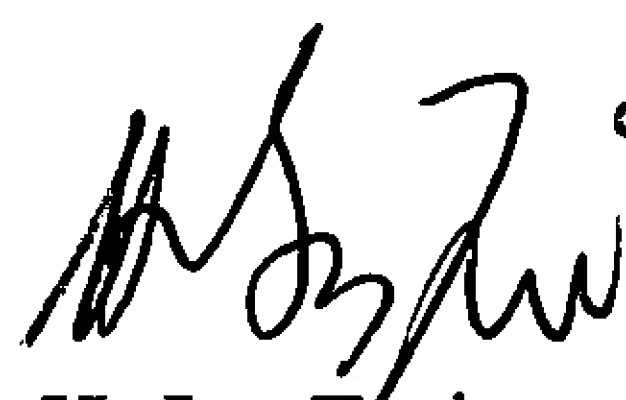
In view of the information disclosure statement filed on March 11, 2005, a new ground(s) of rejection presented in this Office action as set forth above. And, the Notice of Allowance mailed on Dec. 21, 2004 is vacated. Fujii et al. clearly teaches introducing metal organic material ( $\text{Sr(DPM)}_2$  and  $\text{Ti(OC}_3\text{H}_7)_4$ , inlets 28-29) and oxidizing gas (oxygen, inlet 25) into vacuum chamber through separate introduction inlets, see fig. 2, col. 7, lines 10-30, heating the substrate ( $180^\circ\text{C}$ ) in the vacuum chamber and keeping the total pressure of the vacuum chamber at less than  $< 1 \times 10^{-2}$  torr ( $5.7 \times 10^{-4}$  torr through out the period of the film deposition), col. 7, lines 10-30.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to H. Jey Tsai whose telephone number is (571) 272-1684. The examiner can normally be reached on from 7:00 Am to 4:00 Pm., Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Lebentritt can be reached on (571) 272-1873. The fax phone number for this Group is (703) 872-9306.

hjt

5/31/2005



H. Jey Tsai  
Primary Examiner  
Patent Examining Group 2800